

REMARKS

Applicant has carefully studied the outstanding Office Action. The present response is intended to be fully responsive to all points of rejection raised by the Examiner and is believed to place the application in condition for allowance. Reconsideration of the application is respectfully requested as the arguments set forth below are believed to place the claims in condition for allowance.

As examined the application included claims 1-43, of which claims 1-18, 22, 23, 25-27 and 29-34 were withdrawn. The pending claims have not been amended.

Claims 19-21, 24, 28 and 35-43 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Publication No. 2002/0000066 to Bentley et al. (“Bentley”) in view of U.S. Patent No. 5,522,723 to Durst et al. (“Durst”). Applicants respectfully traverse the rejection.

Bentley describes a cylindrical reformer reactor which receives reactants at its center. The reactants flow outward through four zones. The first zone at the center of the reactor includes a partial oxidation reaction vessel in which fuel, steam and air react to form hydrogen and carbon monoxide (Bentley, paragraphs [0038] and [0039]). “The second zone 20 contains a catalyst suitable for catalyzing a steam reforming reaction” (Bentley, paragraph [0042]). “The third zone 22 contains a catalyst suitable for catalyzing a high-temperature shift reaction” (Bentley, paragraph [0043]). “The fourth zone 24 contains a catalyst suitable for catalyzing a low-temperature shift reaction in the reaction stream” (Bentley, paragraph [0044]). As is well known, shift reactions include the conversion of water and carbon monoxide into hydrogen and carbon dioxide.

Durst describes a burner with porous material therein. The material increases in porosity from the inlet side to the outlet side. Below a certain porosity flame development is suppressed (Durst, Abstract and Fig. 2).

The Examiner has not established a *prima facie* case of obviousness because 1) there would not be a reasonable expectation of success when combining Bentley and Durst, and 2) there is no motivation to combine their teachings.

One of ordinary skill in the art would not have expected features of Durst to successfully combine with the features of Bentley. Bentley is directed to a reformer reactor, while Durst is directed to a burner. The reactions that take place in each of Bentley's reformer reactor and Durst's burner are substantially different. There is no indication in Durst of what effect the pore sizes he discloses would have on reforming or shift reactions. If the pore sizes described in Durst were added to the reformer reactor of Bentley, they could entirely hinder the reactions described in Bentley, or they could have no effect on Bentley. There is no indication that this modification of Bentley could or would be successful.

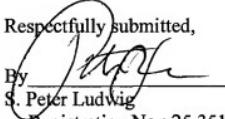
Further, there would have been no motivation to combine the teachings of Durst with those of Bentley. The Examiner states that Durst discloses the use of a first porous material with a smaller pore size than a second porous material "in order to provide a combustion chamber having a flame that burns steadily at low temperature and with low pollutant emission" (Detailed Action, page 3, lines 8-10). The Examiner contends that "it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the pore size of the first porous material smaller than that of the second porous material in Bentley's apparatus, as taught by Durst, in order to provide a flame that burns steadily at low temperature and with low pollutant emissions within" (Detailed Action, page 3, lines 11-15). Applicants respectfully disagree.

Bentley's reformer does not include a flame driven reaction. Bentley's reactor includes steam reforming and shift reactions. Thus, the Examiner's suggestion to modify Bentley in order to provide a flame that burns steadily, is not well founded. There is no flame in Bentley and no reason to "provide a flame" in Bentley. The addition of a flame to Bentley would be undesirable, as it would burn off the hydrogen that Bentley's apparatus is aiming to produce. Finally, it is unlikely that the presence of a flame would be possible in a steam reformer, given the abundance of steam in the device. The steam would hinder the chemical reactions and prevent combustion. For the foregoing reasons, it is respectfully submitted that it would not have been obvious to combine the teachings of Bentley and Durst and that it would not have been obvious to combine the teachings of Bentley and Durst and that claims 19-21, 24, 28 and 35-43 are patentable over Bentley and Durst. Withdrawal of this ground for rejection is respectfully requested.

In view of the foregoing remarks and amendments, all of the claims are deemed to be in condition for allowance and such action is earnestly solicited. Favorable reconsideration and allowance of the application is respectfully requested.

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Respectfully submitted,

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